

or by natural means. Another exhibit may be for the purpose of showing the distribution of corresponding implements over different geographical areas. These and similar special exhibits are instructive, and under proper restrictions should be made; but unless the design of each exhibit is clearly explained, the average visitor to a museum will be confused and misled, for such objects so grouped convey a different impression than when exhibited with their associated objects in proper geographical sequence.

The anthropology of America is now being investigated, and the results are being made known through museums and publications as never before.

The thoroughly equipped Jesup North Pacific Expedition, with well-trained anthropologists in charge, was organised for the purpose of obtaining material, both ethnological and archaeological, for a comparative study of the peoples of the northern parts of America and Asia. Although only in the third year of its active field work, it has already furnished most important results and provided a mass of invaluable authentic material.

The Hyde Expedition, planned for long-continued research in the archaeology and ethnology of the south-west—a successor in regard to its objects to the important Hemenway Expedition—is annually adding chapters to the story of the peoples of the ancient pueblos.

The results of the extensive explorations by Moore of the mounds of the southern Atlantic coast are being published in a series of important monographs.

The Pepper-Hurst Expedition to the Florida Keys has given information of remarkable interest and importance from a rich archaeological field before unknown.

The United States Government, through the Bureau of Ethnology of the Smithsonian Institution, has given official and liberal support to archaeological and ethnological investigations in America.

The constantly increasing patronage, by wealthy men and women, of archaeological research at home, as well as in foreign lands, is most encouraging.

The explorations in Mexico and in Central and South America, the publication in facsimile of the ancient Mexican and Maya codices, the reproduction by casts of the important American sculptures and hieroglyphic tablets, all have been made possible by earnest students and generous patrons of American research.

The numerous expeditions, explorations and publications of the Smithsonian Institution and of the museums of Washington, Chicago, Philadelphia, New York and Cambridge, are providing the student of to-day with a vast amount of authentic material for research in American and comparative anthropology.

The Archaeological Institute of America, the American Folk Lore Society, and the archaeological and anthropological societies and clubs, in active operation in various parts of the country, together with the several journals devoted to different branches of anthropology, give evidence of widespread interest.

Universities are establishing special courses in anthropology, and teachers and investigators are being trained. Officers of anthropological museums are preparing men to be field workers and museum assistants.

The public need no longer be deceived by accounts of giants and other wonderful discoveries. The wares of the mercenary collector are at a discount, since unauthentic material is considered worthless. Anthropology is now a well-established science. It is required of those who follow any of its branches to do so in seriousness and with scientific methods.

With all this wealth of materials and opportunities there can be no doubt that anthropologists will in time be able to solve that problem which for the past half-century has been discussed in this Association—the problem of the unity or diversity of prehistoric man in America.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A LARGE amount of information referring to examining authorities and educational institutions in this country appears in the students' numbers issued by several of our contemporaries. The *British Medical Journal* of August 26 and the *Lancet* of September 1 are almost entirely devoted to descriptions of the various methods by which a student may become a fully qualified

practitioner. The *Chemical News* of September 1 gives a list of British universities and the chief colleges, technical schools, and institutes. The *Chemist and Druggist* of September 2 contains particulars of the educational requirements for qualification in pharmacy, medicine, dentistry, and veterinary surgery.

SOME time ago a departmental committee was formed to report as to the buildings and site of a proposed new Royal College of Science for Ireland. It is now announced by the *Times* that the Government have arranged to acquire the whole of the house property and ground occupying the site recommended by the departmental committee in addition to the buildings mentioned in the report. The total area thus acquired amounts to over 50,000 superficial feet, and the new buildings will have a frontage both on Kildare Place and Upper Merrion Street, and will, as the report recommends, be in immediate connection with the Museum of Science and Art.

THE West Ham Municipal Technical Institute is one of the newest of the London Polytechnics, and the first session of full work will commence towards the end of the present month. The Institute has been built by the Council of the County Borough of West Ham at a cost of 45,000*l.*, and a further sum of 15,000*l.* has been spent upon the equipment and fittings. Under the direction of the principal, Mr. Albert E. Briscoe, an admirable programme of classes has been prepared; and a glance through it shows that provision has been made for theoretical and practical instruction in most branches of pure and applied science and art. Every effort appears to be made to encourage students to use wisely the educational facilities which the Institute affords. As an instance of the excellent policy which is being pursued, the following extract from the "Program" just published is noteworthy:—"Trade students are urged not to make the mistake of joining trade classes only. If any thorough knowledge of the principles of their trade is to be gained, they must possess an acquaintance with elementary science, and have some knowledge of arithmetic, mensuration, and elementary mathematics. For example, very little progress can be made in building or engineering drawing without some knowledge of elementary geometry; plumbing and engineering students will not obtain a clear grasp of their work unless they have some knowledge of elementary physics, of arithmetic, and elementary mathematics. They are further advised to pursue thoroughly the study of one or two subjects, and not waste their energies by attempting to cover the whole ground of science, and so obtain only a smattering of knowledge. The advantage of systematic study in science lies not so much in the number of facts learnt as in the training in habits of accuracy of work and thought, that enables men to attack new problems as they present themselves in a manner likely to ensure their successful solution." Much may be hoped from a Polytechnic in which such sound educational principles are impressed upon the students.

SCIENTIFIC SERIALS.

American Journal of Science, August.—Rotatory polarisation of light in media subjected to torsion, by A. W. Ewell. The difficulties encountered in the choice of a proper material for experiment are very great, as already pointed out by Verdet and Werthelm. The author found a satisfactory combination in jelly supported in rubber tubes, and the observations with jelly, corroborated by a few observations with glass, demonstrate that torsion of a cylinder produces the rotatory polarisation of a ray proceeding in a direction parallel to the axis of the cylinder, the rotation of the plane of polarisation being opposite to the twist, and a function of the twist of degree higher than the first.—Studies in the Cyperaceæ xi., by T. Holm. This article deals with the abnormal development of some specimens of *Carex stipata*, Muhl., caused by *Livia vernalis*, Fitch.—The constitution of tourmaline, by F. W. Clarke. The author discusses the respective merits of Penfield and Foote's formula for tourmalines, regarded as salts of the alumino-borosilicic acid, $H_{11}Al_3B_3Si_4O_{21}$, and his own derivation from the similar acid, $H_{14}Al_3B_3Si_4O_{21}$, with all of the hydrogen atoms replaceable by bases. He retains the general form of his own formula, but suggests that certain irreducible differences of constitution may be due to the fact that there exists a series of borosilicic acids.—Determination of tellurous acid in the presence of haloid salts, by F. A. Gooch and C. A. Peters. In the estimation of tellurous acid by oxidation with excess of potassium permanganate, no correction

is necessary when the tellurous oxide is dissolved originally in an alkaline hydroxide and the solution made acid only to a limited degree with sulphuric acid.—An iodometric method for the estimation of boric acid, by L. C. Jones. The method is based upon the employment of mannite and of a mixture of potassium iodide and iodate.—A method for the detection and separation of dextro- and lævo-rotatory crystals, by D. Albert Kreider. The method is based upon the use of a kind of polarimeter with a wide field of vision of a uniform colour, adjusted in such a manner that any small crystal instantly reveals the sense of its rotation by its colour when brought into the field.—New meteoric iron found near the Tombigbee River, Choctaw and Sumter Counties, Alabama, by W. M. Foote. The fall consisted of a series of pieces found in almost a straight line north and south along a nine-mile stretch of the public road—Orthoclase crystals from Shinano, Japan, by C. Iwasaki. Describes four different classes of orthoclase, mostly twinned after the Baveno type.

Wiedemann's Annalen der Physik und Chemie, No. 7.—Smallest thickness of liquid films, by K. T. Fischer. The author brings the widely varying results of various observers into approximate harmony by supposing that when a drop of oil is placed on a surface of pure water, a "precursory film" spreads over the water first, and is followed at a slower rate by the film studied by Sohncke and others. For his own experiments the author used a pure mercury surface, which he found to possess various advantages.—Wehnelt's electrolytic interrupter, by A. Voller and B. Walter. The hydrogen lines are very pronounced in the spectrum of the Wehnelt spark. Intense and pure metallic spectra may be obtained by choosing the metal in question as the substance of the anode. The hydrogen lines do not interfere, but serve as lines of reference.—Kathode rays, by A. Wehnelt. The author distinguishes between two classes of kathode ray shadows. One class is produced by rays emerging from the kathode normal to its surface and crossing each other at a focus in the case of a curved kathode. The other class consists always of upright shadows, thrown by rays travelling in a direction parallel to the axis of the tube.—Cause of the change in the conductivity of a metallic powder, by T. Sundorph. The author proves the formation of connecting chains of particles in a coherer by sparking across the gap between two metallic blocks on a glass plate, with a layer of nickel or iron filings between them.—A new vacuum discharge phenomenon, by L. Fomm. A vacuum tube is surrounded by wire rings at its two ends. At a certain exhaustion blue rings appear, concentric with the wire rings, and enclosing patches of positive light, which gradually disappear until the blue light fills the whole cross section. As the pressure diminishes still further the blue light detaches itself from the glass walls, and expands longitudinally, forming a greenish-blue beam which proceeds in the direction of the other ring, and shows all the properties of kathode rays.—Some experiments with Wehnelt's interrupter, by E. Lecher. The author describes some beautiful phenomena obtained by bringing the secondary spark discharge of a Wehnelt interrupter into a magnetic field. The secondary current is unidirectional, and is therefore deflected in a constant direction. When the discharge takes place between a circle of wire and a disc mounted in its plane, and concentric with it, the discharge consists of curved spokes of light which rotate rapidly, in a sense governed by the polarity of the magnet. The discharges form a kind of fire-wheel as displayed in pyrotechnics.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 28.—M. Michel Lévy in the chair.—On the general form of the equations of dynamics, by M. P. Appell. The advantage of the form of equation described is that it allows the use of parameters which are not true coordinates, but are connected with the coordinates by non-integrable differential relations. The method is of especial service in problems of rolling.—On the velocity of detonation of acetylene, by MM. Berthelot and Le Chatelier. Acetylene was detonated in a glass tube by caps of mercury fulminate or chlorate powder, care being taken to have the detonator as small as possible, as it was found that irregularities were introduced if the detonator used was too violent. The acetylene was contained in horizontal glass tubes, under pressures varying from 5 to 36 atmospheres, and the velocity was registered

photographically upon a falling sensitised plate, the light emitted by the explosion itself being sufficient for the purpose. As the flame moved further from the source of explosion the velocity continually increased, the tube generally breaking before the speed became uniform. Even when the conditions of inflammation and pressure are apparently precisely identical in two succeeding experiments, discordant results were sometimes obtained for the increase of velocity of the flame along the tube. The results show that the propagation of the detonation of acetylene is produced with a velocity which increases with the pressure from 1000 metres per second at 5 atmospheres pressure to 1600 metres per second at 30 atmospheres.—M. Henri Moissan communicated to the Academy a letter he had received from Prof. Dewar, of London, in which details were given of the solidification of hydrogen. Solid hydrogen melts at 16° absolute (-257°), and at this temperature helium is liquefied under a pressure of 8 atmospheres.—Discovery of a new planet at the Observatory of Paris, by M. Jean Mascart.—The Perseids in 1899, by M. C. Flammarion. The tabulated list is accompanied by a chart showing the point of origin and direction of motion of the Perseids in 1899.—On beats given by vibrating strings, by M. C. Maltézos. The ordinary equation for a thin elastic string giving the relation between the number of vibrations, tension, section, and length of string gives no explanation of the phenomenon of beats. If the rigidity of the string be taken into account, the author theoretically deduces an expression for the number of vibrations from which can be deduced that the number of beats is proportional to the square root of the area of section, inversely proportional to the cube of the length, and inversely proportional to the square root of the tension. The last conclusion has been verified experimentally, but instead of the number of beats being inversely proportional to the cube of the length of the strength, it is nearly inversely as the length simply. Hence it is impossible from rigidity alone to explain all the phenomena of beats in vibrating strings.

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